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July 18, 1991

TO: Minerals File

FROM: Holland Shepherd, Senior Reclamation Specialist, and HWS
Wayne Hedberg, Permit Supervisor ~~or~~ WH

RE: Joint Site Inspection, Bingham Canyon Waste Dump Leaching System, Kennecott Utah Copper, M/035/002, Salt Lake County, Utah

Date of Inspection: July 16, 1991
Time of Inspection: 9:00 a.m. - 12:00 p.m.
Conditions: Hot, sunny, dry
Participants: Cindy Emmons, Bill Bogden, Paul Rokich, Fred Fox, Kennecott; John Whitehead, Division Water Quality (DWQ); Wayne Hedberg, and Holland Shepherd, DOGM

This inspection was conducted to evaluate the operator's waste dump copper leaching circuit. The leaching circuit has been the subject of concern for several years now, as a source of surface and groundwater degradation. Portions of the site believed to contribute to local water quality degradation include: the Bingham Reservoir, the leach dumps and the solution ditches. Initially, few of these contributing areas were lined. Some of the ditches are presently concrete lined, and the new (smaller) process solution overflow reservoir has a synthetic liner.

The operator is currently upgrading the leach collection systems to more efficiently contain and control the process waters. This will eventually involve the upgrading of all ditches to at least concrete lining, and the synthetic lining of all solution containing ponds/reservoirs. As mentioned above, the operator has more recently installed a lined pond to collect excess/overflow process waters from the Precipitation Plant (P-Plant).

The larger Bingham Reservoir, however, remains unlined. The operator indicated that only storm water is currently directed to the Bingham Reservoir. The storm water includes water draining off disturbed and undisturbed areas of the mine site during precipitation events. Storm water runoff from the various disturbed areas most likely contains other contaminants from the mine site, though probably less

problematic than the acidic process/leach waters. The operator is only allowed to discharge water from the reservoir to the tailings slurry lines. The amount of water allowed for discharge is limited by the operators UPDES permit.

Our inspection initiated at the P-Plant. Here, the leach solutions are pumped through columns of shredded scrap iron which results in a natural ionic exchange of copper for iron. Iron sulfates then become a major constituent of the leach circuit as evidenced by concentrated red-brown staining along ditches, ponds and on the leached dumps. Barren leach solution pH averages around 2.5 - 3.0. This is pumped back onto the leach dumps.

The second stage of the trip consisted of an inspection of the east leach dumps, 5816 and 5960 (elevation and dump designation). The material composing these dumps is quite old. The dumps have been leached intermittently for many years. Dump 5816 is no longer being leached. Portions of Dump 5960 were being actively leached at the time of our inspection. Most of these old "rail dumps" are between 40-50 years old. The last dumping was conducted around 1983. Some dumps are approximately 100 years old. Leaching was initiated in the mid-1960's.

The material composing the dumps is extremely acidic. There is no evidence of natural plant invasion. These dumps have never been lined. Consequently, they are a likely contamination source, contributing to the groundwater degradation problem discussed in the 5-year Joint Hydrogeologic Study, initiated in 1984. The leach dumps will present a monumental problem to reclamation, because of the acid-soil problem. The Division's records indicate that Kennecott has never initiated a dialogue or conducted notable research in development of a reclamation plan for the dumps.

The 3rd stage of the inspection consisted of an evaluation of the dump leach solution delivery ditches. Most of these ditches are concrete lined, however, some are still unlined. The concrete ditches are showing some deterioration along the base, probably resulting from the constant flow of highly acidic solutions. The unlined ditches also contribute to the local groundwater degradation problem.

Ms. Emmons indicated that the process solution collection facilities were in the process of being upgraded, resulting from negotiations with EPA and DWQ. Exactly what this entails is unknown to us until we obtain copies of the specific plans. The current collection system (design and configuration), as presented to us by Mr. Bill Bogden, is somewhat confusing and difficult to understand. It is important that the regulatory agencies develop an accurate understanding of the dump leaching system in order to evaluate and eliminate existing and/or potential problem(s) which may result from its continued use.

We briefly observed ongoing construction at the Blue Water II Repository site, located west of and adjacent to the Bingham Reservoir and the leach dump area. Kennecott is currently disposing of the Bingham Creek lead tailings at this site. The area has been clay lined and involves approximately 15 acres. It will later be capped, covered with topsoil, and reseeded. Plans for the repository have been made available to EPA, DER and DWQ. The plans have not yet been made available to this Division.

We looked at some 10-year old reclamation performed above the old Lark townsite. The Willow Springs reclamation was performed after a slide impacted the area. The slide resulted from over-steep mine waste dumps. The dumps located above Lark, are several hundred feet high and reside at the angle of repose @37°. The reclamation was quite good.

The last portion of our visit consisted of an evaluation of the leaching circuit solution reservoirs. A small reservoir was completed last spring, 1991. It is lined, fenced and utilizes wildlife hazing devices. It was full of process solution water at the time of our inspection. This is an overflow pond for the excess leach dump process solutions which cannot be contained/handled within the P-Plant leach circuit. This lined reservoir also handles some sanitary waste water from the Copperton concentrator facilities. The large reservoir is currently used only for stormwater runoff. The operator is attempting to drain it by using enhanced evaporation techniques. The impoundment currently contains 500 acre feet of water. It will take a long time to evaporate the water. The DWQ will not allow Kennecott to discharge the water, except to the tailing slurry lines. The Bingham Reservoir sediments will eventually be mucked out, deposited somewhere on the leach dumps, then reclaimed. A portion of the reservoir will then be lined.

A resolution to the water degradation problems, resulting from the use of this leaching circuit, is currently being worked out between DWQ, EPA and Kennecott. The details of the agreement/plan are not yet available and probably are still being developed. Mitigation will involve improving the ditch/collection system and upgrading the ponds. Nothing is currently planned for the leach pads, which also contribute to the problem, whether they are being leached or not.

jb
cc: John Whitehead, DWQ
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